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THE great Old World discovery that labor, by refusing to labor, can inflict upon capital such loss and disaster as to force the standard of wages to a higher level, has been completely overshadowed by the modern American device, whereby the same end is apparently to be obtained with far greater circumstance and effect by blocking all the wheels of commerce, and stopping the trains upon the railroads. The first practical application of this bold invention has indicated that unlawful combinations of dissatisfied train-hands may at a stroke bring about results as disastrous to the nation as the invasion of a foreign enemy, and fill the land with sounds and portents of war. We are too familiar with the operations of mechanics' strikes at home and abroad in their effect upon building operations and building trades, and with the various contrivances, such as forced limitations in hours of labor and in employment of apprentices, the arbitrary subdivisions of trades, and the equalization of wages among skilled and unskilled, whereby the trades-unions, which are forms of communism, assert control over the masters in a manner really hostile to the best interests of the working-man. We know that in certain places the unions fine a laborer for carrying more than a given number of bricks in his hod, or a bricklayer for laying other than a certain kind of bricks; that stone-masons are not allowed to lay a brick, and bricklayers are not permitted to lay a stone; that masters are frequently forbidden to work at their own trades with their own hands; we know of the late Doulton strike, for example, in which all the bricklayers stopped work for several months because two skilled workmen, not bricklayers, were employed to lay up certain ornamental parts of the terra-cotta; we know moreover that contractors, subject as they are at all times to arbitrary limitations from their journeymen as to the manner of fulfilling their obligations, and to tyrannous dictation as to wages, frequently decline to take time-contracts without an extravagant margin of profit to cover such contingencies. But these difficulties, although they have hitherto defied the efforts of political economists to adjust them by any system of arbitration capable of general application, are of minor importance as compared with the last great movement which has involved interests infinitely greater and more extended.

WE can conceive that the leaders in this last and greatest of all strikes little realized how dangerously successful their enterprise would be. They not only embarrassed the railroad companies against which their unlawful schemes were primarily directed, but through the strange complications and entanglements of modern society, inflicted grievous loss and distress at many unexpected points far and near, directly and indirectly, present and future; moreover, they aroused a riotous following, which killed, burned, robbed, and destroyed in every direction; so that suddenly they found themselves opposed by all the force of civilization, against which they at last discovered they could make no headway. They have succumbed; and the utmost limits of their disorganizing power having been by this experience distinctly defined, once for all, we believe society will profit by the lesson, and provide commensurate means to protect itself against any possible repetition of the evil,— in this shape at least. Our capacity to provide remedies for any forms of social disorder, or for any abnormal developments of crime, as soon as they have become powerful enough to inflict public disasters, has been heretofore repeatedly tried, and not found wanting. We shall have no more such combinations of laborers and mechanics, with the idle and dangerous classes behind them, against the common welfare, — no more social wars of this kind. Now that we know what they are, we can provide a remedy. But if injustice against labor really exists, and if at the bottom of the turmoil there lies the evil of insufficient wages or unfair exactions of any kind against the working-man, the remedy for this is not so easily found.

WHO is to arbitrate between employer and employed? By what principles is the arbitration to be guided, and how is the arbitration to be enforced? A court of appeal in cases between classes whose interests are so widely divergent must, humanly speaking, be free from the possibility of bias. No existing courts could serve the purpose, as their judges are popularly supposed to belong to a class naturally out of sympathy with labor as opposed to capital. Each party is prompt to combine and organize against the other. It would seem at first sight that in this facility for organization may reside a means of safety. Let these organizations be defined and protected by law, and entitled to elect a permanent commission of arbitration, paid out of public funds; let the only appeal from the decisions of this tribunal be to the final courts of law, and let such decisions be enforced by law. Does it not seem that the accumulation of difficult cases before such a tribunal would indicate the points needing legislation, and that in course of time there would be created a body of laws sufficient to meet every emergency of dispute between capital and labor, and prevent injustice and tyranny on the part of either toward the other? The principles of arbitration are much better understood in England than here, and are frequently put into practice with excellent effect. The subject has received the earnest attention of publicists like Mr. Hughes and Mr. Mundella, and there has been considerable parliamentary legislation on the subject, the records of which might be consulted with great advantage to ourselves, as the conditions in the two countries cannot greatly differ.

IT is common to say that the rate of wages, like that of all other prices, must be governed by the law of supply and demand. Of course, if the supply of laborers is great and the demand for them small, wages must be low; if the supply is small and the demand great, they must be high; and so on. But it has been found in modern times that wages do not adjust themselves to these natural fluctuations without a conflict of classes. If wages ought to rise, and capital is unwilling to accept the condition, the laborers are justly outraged; if they should fall, and laborers will not submit to the reduction, capital in turn is in trouble. It is a continual epic of sorrows, with a background now of starvation and distress to labor, now of bankruptcy and financial ruin to capital. If a tribunal of arbitration could be formed, which should have the respect of both parties, it seems natural to suppose that its decision regarding the adjustment of wages would go far towards alleviating these sorrows, and would certainly remove the sense of wrong and oppression and all incitement to acts of rebellion or tyranny. These suggestions of course refer mainly to the building trades and manufactures; they are made more for the purpose of eliciting discussion among those who are most intimately concerned with the employment of labor than with any hope of presenting in a word any thing like a final demonstration of a problem so difficult and so intricate. Architects are frequently called upon to act in a sort of judicial capacity in certain minor cases of difference between labor and capital, and perhaps by experience are in a position to discuss this question with intelligence and effect.

THE commission appointed to erect a new Hospital for the Insane, for the South-eastern District of Pennsylvania, invite in our advertising columns a general competition of architects as a preliminary to this object. The programme of requirements includes plans for an extensive range of hospital buildings of various kinds, for at least seven hundred and fifty patients, with large separate accommodations for administration, officers' dwellings, an amusement hall, laundry, kitchen, bakery, boiler-house, gas-house, water-works, workhouses, laboratory, and lodgings for employees; together with complete schemes for heating, ventilation, and drainage; the whole to cost not more than six hundred thousand dollars. At least six sheets of drawings are required in addition to the specifications and estimates, and these are to be presented on or before Sept. 8, 1877. The authors of the five selected plans are each to be paid three hundred dollars in full for such plans, specifications, and estimates, and from among *all* the competitors one or more are to be chosen as architect or architects of the hospital, "provided the commission deem it to be in the best interests of the work to make such appointment." Admitting that a general competition is necessary, the commissioners are of course bound to avoid committing themselves to any perilous promises as to the ultimate selection of their architect from among the competitors; for it is evident that among the great crowd of unemployed architects, draughtsmen with little experience, and students with none, with whose plans and schemes the commissioners have thus prepared to embarrass themselves, there will be few — more probably none — to whom they could properly intrust interests so important and so complicated. On the other hand, in the absence of such promises, it is equally evident that no architect of repute and experience, to whom such interests could properly be committed, would venture upon such a forlorn hope as this programme holds forth, unless he had reason to believe that he had personal "influence" of some kind with the commission or certain members thereof, which "influence" might in some irregular manner improve his chances of success for the attainment of a prize so great. Moreover, no architect who enjoys a good practice which he has earned by fidelity and skill, and force of character, — to say nothing of genius, — would be so improvident of his means as to expend two months of laborious study and office-work, which at a low estimate would cost him six hundred dollars, with a dim prospect of obtaining a return of half that amount, or with the still dimmer prospect (perhaps one chance in fifty) of obtaining honorable and profitable employment in the execution of his design. Thus the honest intention of the commission to obtain the very best practicable results, and to justify themselves by presenting to their constituents the most scientific, convenient, and economical building possible under the circumstances, is defeated by the errors of their programme. This, we fear, adds another to the long list of lost opportunities.

IF the commission for the building of this hospital, or the committee having in charge any important and costly public work of the kind, requiring in its execution an exceptional amount of technical knowledge and administrative experience, would limit their competition (if they must have a competition) to a certain number of architects of assured credit in these respects; if they would lay before them a carefully-prepared programme of requirements; if they would pay the competitors invited a fair amount for the thought and labor and time spent in their service; if they would avail themselves of the advice of approved experts in comparing the relative merits and costs of the designs so submitted, and agree to employ at the usual professional rates the author of the selected design, — they would do greater justice to themselves and to the profession, and serve the public needs with far greater intelligence, promptness, and success. Competitions are a necessary evil at best; but so long as architects are subject to them, it is of the highest importance to the profession and to the public that they be conducted on sound business principles, and not after the fashion of a lottery or a game of chance, in which those having a reputation to preserve cannot embark without loss of self-respect.

IT is to be observed that the Pennsylvania Commission, with the intention of making the wisest use of the $600,000 intrusted to them to expend for a hospital for the insane, have set aside one four-hundredth part of that amount to be divided among five architects, for the purchase of the ideas to realize which they are to expend the rest of the money! Surely the genius, invention, skill, patience, thought, experience, which the commissioners should call to their service, and which are necessary to the preparation of a scheme for the most judicious expenditure of so large a sum, are a combination of qualities rare enough to be worth a very much larger proportion of that amount. It is needless to say that the combination cannot be purchased for the amount set aside by the commission. A few thousand dollars more devoted by them to the procuring of designs from those whose services would be of actual value, would not only secure a practical result more scientific and useful, but would in the end save ten times that amount in the wise economy which is a part of science. The commissioners have in their hands the bestowal of a prize which the most learned and skilful architects in the profession would earnestly contend for to the great advantage of the public; but they have so used their great opportunity as to exclude the best service, and to tempt a multitude of inexperienced aspirants to a gratuitous expenditure of time and study.

OUR valued correspondent "Champlin," continuing the subject of house-drainage, draws our attention to a phenomenon which he has observed in the outflow of waste from his own house. He has a close-built brick cesspool eight feet in diameter and eight feet deep, with an overflow thence for liquids into a percolating stone cesspool ten feet by ten feet; both are domed over at the top, closed each with a flat stone, and covered with soil. Unlike his neighbors, whose cesspools are constructed in the same manner and in the same kind of soil, but who are subjected to the necessity of cleaning out both cesspools at frequent intervals, his own have been in use for four years without being opened, and have given him no inconvenience. A few months ago a deep excavation in the street near his percolating or overflow cesspool revealed the fact that the moisture from it was all absorbed by the roots of three large and very flourishing trees, a tulip and two maples, in its immediate neighborhood. "There could be no accumulation of water," he says, "where there were such channels to draw it up." This certainly is an important point to be considered in locating the area of absorption for household waste. We do not remember to have seen elsewhere noticed this very probable sanitary function of trees, and would be pleased to hear of any other experience in any way bearing upon this point. If the theory is correct, it goes far to solve the most serious difficulty in the problem of drainage without common sewers.

WE took occasion on p. 238 of our Summary, to describe the nature of the commissions intrusted to certain distinguished English artists for the decoration of the wall spaces in Mr. Waterhouse's new Manchester Town Hall. We now learn from our English contemporary, the *Architect*, in its issue of the 14th ult., that this very liberal corporation, in completing its great municipal monument, has still further demonstrated its capacity for appreciating the high civilizing function of such structures, by the character of the fabrics used for hangings in the principal saloons of reception and entertainments. These are not mere costly masses of material provided to order by the upholsterer, but works of art from the school of needlework at South Kensington. One of these is described as a composition of blue cloth in its upper portion, "with a deep dado of blue silk velvet embroidered in silk, with appliqués of velvet representing the cotton plant just bursting into bloom." Others are of red cloth, with a dado "embroidered on a black ground with bulrushes and other plants." We dare to say that no taxpayer of the city, who would consent to having these municipal apartments conventionally set forth with the ordinary silk damask of the shops, could consistently object to such works of art on the ground of inordinate expense. Meanwhile Mr. Ruskin, to whom, more than to any one man, the English people are indebted for the existence of a feeling which renders possible such achievements as this noble hall, in the last number of the *Fors Clavigera* encourages his followers in a manner which has become characteristic of

late, by speaking "of the little lake of Thirlmere, and stream of St. John's Vale, which Manchester, in its zeal for art, is about to drain from their mountain fields into its water-closets (make pictures of these, will you then, my Manchester friends?)"

THE EIGHTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF MASSACHUSETTS.

THE appearance of these reports has become a most important event in connection with sanitary matters. It would be hard to say that each number is better than its predecessor; but certainly each number is full of valuable and important information, stated in so clear and telling a way, that many others than physicians and architects and engineers and professional men generally may receive full benefit from its perusal.

The eighth report (1877) does not fall behind the previous ones either in interest or in value.

While a very large part of it is taken up with questions of Registration, of the Growth of Children, and Diseases of the Mind, the sixty pages relating to the Health of Towns, the equal space relating to the sanitary condition of Lynn, and the long account of the condition as to pollution of the Nashua River, are of collateral interest to the architect and engineer. They contain very much that no one who desires to keep himself at all *au courant* with sanitary matters would be willing to skip over.

The special reports by Dr. Charles F. Folsom on the "Disposal of Sewage," and "Drainage and Health," and the carefully-prepared paper of Mr. Cheesbrough on "Sewerage; its Advantages, Disadvantages, Construction, and Maintenance," appeal directly and in a strictly professional way to all who have to deal with the sewerage and house-drainage questions. Mr. Cheesbrough's paper may be considered rather as an argument in favor of the sewerage of all towns, and especially of the employment of skilful professional advisers, than a handbook for the guidance of engineers. He is particularly strong, and we think particularly sound, on the question of changes in the governing body by which sewer-work is to be executed. "The plan, after being carried out, should not be so changed or modified as to impair its efficiency, which might happen if new men are placed in charge of it. . . . Instances could be mentioned where millions have been squandered and appropriations exhausted, and the people obliged to do without much-needed improvements, for the completion of which they were taxed enough, or were loaded with bonded obligations more than sufficient."

The following quotation will be appreciated by all who have to do with the direction of public or private work: "As in really or supposed dangerous attacks of illness, non-professional people do not begin to consult books or send their neighbors to inquire of people who have had apparently similar diseases, but rather send in haste for an experienced physician whose education and practice would qualify him to say what should be done; so ought cities and towns, through a judiciously-appointed commission, to employ thoroughly trained and experienced sanitary engineers, wherever they may find them, at home or elsewhere, and not attempt to get the necessary knowledge by simply consulting books or sending out committees to visit other places, . . . as the committees sometimes return feeling confident that they know how to plan and carry out such work without further professional aid; but communities find out, after a few years, that they have been educating men at a cost vastly greater than that for which thoroughly competent experts could have been employed."

Mr. Cheesbrough thinks that in villages and towns there may be a cheaper means for removing dangerous organic matter than by expensive sewerage, but insists that this removal must be complete and systematic; no accumulations of surface-filth and no leaking cesspools being allowed. So far as house-sewage is concerned, he thinks a capacity for removing "twenty gallons per hour for each inhabitant" would be abundant for large cities, and extravagant for towns.

Dr. Folsom's paper on the disposal of sewage is itself only an epitome of knowledge acquired during the year; and it would be useless to attempt to bring any fair view of it within the scope of a review like this. The teachings are not all in the same direction; and we see here, as elsewhere, that doctors disagree seriously.

At the meeting of Sanitary Engineers under the auspices of the Society of Arts, held in London in May, 1876, a report was made embodying very important results arrived at; among them this: —

"It was conclusively shown that no one system for disposing of sewage could be adopted for universal use; that different localities require different methods to suit their special peculiarities; and also that, as a rule, no benefit can be derived at present from sewage utilization."

The accounts here given of the results of sewage-farming, covering all of the best-managed cases in England, lead to the conclusion that while no money is generally to be made by this use, agricultural irrigation affords, under proper circumstances, the best means for disposing of the waste of towns. The progress of the irrigation experiment at Gennevilliers, below Paris, is very encouraging; and it seems possible that the whole sewage of that city may be judiciously disposed of under the peculiarly favorable circumstances existing. The investigations thus far made seem to prove conclusively that this irrigation has no unhealthful influence on the outflowing water. "On its effluence from the soil it was found to contain from eight to ten per cent of oxygen, which is an unerring indication of healthy water."

The oxidizing action of an aërated soil in purifying filthy water seems to be generally accepted as one of the chief agents by which foul sewage is converted into pure water. The English Rivers' Pollution Commission say, "The prolonged filtration to which such water has been subjected in passing downward through so great a thickness of soil or rock, and the rapid oxidation of the organic matters contained in the water when the latter percolates through a porous and aërated soil, afford a considerable guaranty that all noxious constituents have been removed."

Dr. Frankland, speaking of river water, says, "By gradual oxidation, this animal contamination has been, so far as analysis can show, converted into innocuous inorganic compounds before the water was submitted to investigation."

Dr. Folsom should hardly have published this quotation from Dr. Alfred Carpenter without giving us a little more: —

"The most important operation which takes place on a sewage-farm is the destruction of contagious particles. The moment they are brought into contact with the spongioles on the rootlets of sewage-grown crops, as may be easily seen in any field of rye-grass which is being irrigated by sewage, the spongioles seize upon the albuminous matters in the sewage by a kind of elective affinity, including the contagium particles, remove them from the water, and digest them with an avidity which is most remarkable; no putrefaction takes place, no retrograde decomposition arises, but the albuminous matter is digested as perfectly as white of egg is digested by the human stomach. Putrefaction is no part of sewage utilization; and, if putrefaction takes place, there is a corresponding decrease of productive power, and also a proof that sewage-farming is not properly carried out."

Coming to us in this bald form, it suggests the query, just how we are to go to work to see the sponge-holes seize albuminous matters by a kind of elective affinity; how we are to study their avid digestion; whether it is quite definitely known that the plant absorbs any putrescible matter before its decomposition. From an agriculturist's point of view, Dr. Carpenter seems to have been, "on this occasion only," somewhat enthusiastic.

In Dr. Folsom's reference to the fever in the Uppingham School, and Mr. Rogers Field's report thereon, we have the following, which might apply almost without change to nearly every small town in the country: "The town is at the present time essentially a cesspool town, and nearly every house has its own well, very many of which are situated near cesspools or other sources of contamination." Of the twelve houses constituting the school, he adds, "Twelve drain either wholly or for the most part into cesspools," and, "in ten houses, each has one or more of its wells badly situated from contiguity to cesspools or foul drains."

We have seen no stronger statement of the sanitary influences of air which we breathe, than is contained in the following, from "Yellow Fever and Malarial Fever," by Dr. Greensville Dowell, that "the diseases cannot be taken in pure air from persons, clothing, trunks, or black vomit; but in impure air, other things beings suitable, it can be taken from either."

THE ILLUSTRATIONS.

CATHEDRAL OF ST. LORENZO, GENOA, ITALY. — GRAND STAIRWAY OF THE UNIVERSITY, GENOA, ITALY.

THE Cathedral of St. Lorenzo was built in the eleventh century, and was restored about 1300; but the façade belongs to an even later date. In some part of the church are inscriptions which state that the north side was completed in 1307 and the south side in 1312. These inscriptions are engraved in capital letters, of a form similar to those employed in contemporary manuscripts.

The nave is preceded by a Gothic inner porch with a groined roof, which, together with the pilasters which support it, is formed of alternate courses of black and white marble. The division between the nave and aisles is marked by Corinthian columns which support pointed arches. Each column is made of alternate layers of serpentine stone of the variety known as *Polcevera breccia*, and white marble. Upon these arches rests an entablature which bears a long inscription in Gothic letters; and over this again is a second tier of round arches which are supported by alternate short columns and pilasters, the latter of which are in the early Italian-Gothic style. The choir and side-chapels have been modernized and covered with carving, painting, and gilding.

The richest portion of the cathedral is the chapel of St. John the Baptist, into which no female is allowed to enter except on one day in the year. This practice was instituted by Pope Innocent VIII., to keep fresh the infamy of the daughter of Herodias. The screen which divides the chapel from the rest of the church is rich *cinque-cento* Gothic, and was finished in 1496.

We are encouraged to reproduce the above-mentioned drawings from the rare work of M. G. Bourgerel (*Fragments d'Architecture et de Sculpture*) as examples showing how a really good sketcher seizes upon the characteristics of his subject, and concentrates his attention upon them to the exclusion of details that would be

irrelevant to the effect that he is aiming to produce. These sketches illustrate so aptly the views which we have already expressed on this subject (see *American Architect and Building News*, Vol. II., p. 10), and the subject itself is of such importance in its application to our own work, that we venture to repeat the points in question:—

"A common notion is that a sketch is an incomplete drawing, or perhaps a rough drawing; but a sketch, in the proper and artistic sense of the word, differs from a drawing in kind rather than in degree. To draw is to represent, as well as drawing-materials will allow, the whole aspect of a thing. In imperfect drawing one goes as far toward this as his means, his time, or his skill permits. To sketch is to select some particulars of one's subject, and reject others, with a view to a preconceived effect. The sketcher chooses some few characteristics or a single characteristic, and sets it forth with as much decision as possible: the draughtsman represents his subject as completely as he may under the circumstances, and stops. The essence of the sketch is in the selection of elements and in the combination of them so as to produce a single impression decided upon beforehand. A sketch is one-sided, a drawing is incomplete. It follows, therefore, that there will be more diversity among sketches than among drawings. . . .

"The more you strip away from your subject, the more important it is to see that the things you keep shall be of value. Next to direct falsity, the worst offence of a sketch is emptiness: whether it appears in the guise of careless dash or of laborious puttering, this is alike offensive. . . .

"When a man has any thing decided to say, and knows his means of expression, he is pretty sure to say it with spirit, if there is any spirit in him. If there is none, he will not succeed in counterfeiting it. . . . Sketching is not a careless or a lazy or an easy occupation. It may be quick and decisive, but it demands extreme care. The lazy man will do better in drawing. The cardinal quality of a sketch is concentration. Hence the whole of it must be foreseen from the beginning. Every unconsidered or unnecessary touch in it is an impertinence. The less there is in it, the greater care is necessary that that little shall be good."

COTTAGE NEAR COLUMBUS, OHIO. MESSRS. KIRBY AND CAMERON, ARCHITECTS.

(121 South High Street, Columbus, O.)

DETAILS FROM THE STORE OF GARDNER BREWER, ESQ., BOSTON, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

This is another of the drawings prepared under the auspices of the Portfolio Club.

HEATING AND VENTILATING THE HÔTEL DE VILLE, PARIS.

THE scheme for heating and ventilating the Hôtel de Ville at Paris must be examined from the point of view of its supplying the different suites of apartments into which the building is divided. Some of these suites, as for example, that of the Municipal Council, and that for municipal festivals, require only an intermittent supply, while others require a more constant supply.

In order to warm and ventilate the several apartments, it is necessary to unite them in several groups according to their several needs; and for this reason five grand divisions have been adopted, each wholly independent of the others. These are: 1, The suite of the Municipal Council. 2, The suite of the Prefect. 3, The various offices. 4, The bureaus of loans and collections (*emprunts et tirages*). 5, The state apartments.

All the steam that is needed for these five groups is generated in boilers placed in the centre of the sub-basement of the building. These boilers are capable of generating more steam than there is ever any need of using, even if all the rooms have to be heated at the same time; a thing which never takes place. This excess of capacity has been provided, that the periodic cleansing and any necessary occasional repairs may be effected without the inconvenience occasioned by shutting off the heat.

The most important point, the point which forms, as it were, the base of the scheme, is the means that have been provided for introducing fresh air into the building; and we are going to consider each of the groups separately, contenting ourselves with a summary description of the arrangements indicated in the accompanying section of the building.

1. *Service du Conseil Municipal.*[1]—The suite of the Municipal Council comprises a large council chamber, with its dressing-rooms, refreshment-room, committee-rooms, offices, etc. The most important consideration is the heating and ventilation of the council chamber. The purposes for which this is used prevent the adoption of any visible heated surfaces; these surfaces will therefore be placed outside, and will there perform the office of furnaces, discharging heated air into the room by means of openings in the walls, at the level of the floor, and also by openings arranged above (*en contre-haut*) at a height sufficient to prevent persons from feeling too directly the entering air. The openings at the level of the floor are intended to be used for heating the hall before it is occupied; while after the hall is occupied, the supply of heat issuing from these openings can be considerably lessened or even entirely shut off, while the upper openings are brought into use. The aspiration of the vitiated atmosphere takes place through openings in the risers of the steps upon which the seats are placed.

The temperature of the fresh heated air can be regulated at pleasure, but it should not exceed 35° centigrade. The pressure of the air in the hall is to be always a little in excess of that of the outer atmosphere, so that there will be no troublesome draughts drawing in from the outside. The other rooms of this suite will be warmed by unconcealed steam-coils, and ventilated by special ventilators.

Service du Préfet.[1]—The suite of the Prefect comprises on the ground floor, the grand staircase, some minor offices, and the stables; in the entresol, the private offices and apartments; and finally on the first floor, the reception-rooms, the cabinet of the Prefect, and the grand dining-hall. These rooms present such varying conditions, that we will examine the arrangements adopted for each of them; and first, as to the *Salons du Préfet.* These will be carefully ventilated. Assuming that four persons per square mètre is the maximum number to be provided for, arrangements have been made for an hourly admission of thirty cubic mètres of fresh air per person. The entrances for heated air are placed as in the rooms previously described. Although the greater portion of the vitiated air is to be drawn out near the floor, yet it has been thought good to arrange at the top of the room an exit for bad air, which experiments made at the old Hôtel de Ville prove should furnish one-quarter of the total ventilation. Here, too, the air will be under a pressure slightly in excess of that without. The entrances for fresh air are to be placed as far as possible from the ascending currents of air vitiated by the combustion of gas.

The ante-chambers, passages, and staircases will be heated from the floor, and to a higher degree than is the salon. Before the arrival of the guests the heating will be managed as already explained; but as the rooms fill, each individual bringing a new source of heat, the temperature of the fresh hot air introduced will be gradually lowered, until, if it is desired to keep the temperature of the rooms constantly the same, air of a lower temperature than that of the saloon must be introduced. This necessity requires a great nicety in the adjustment of the apparatus, and it is only by steam heating that entirely satisfactory results can be attained. The heating surfaces placed above the ceiling are heated by steam, the supply of which can be regulated at will. The vitiated air finds exit near the floor, and passes out into the inner courts, where an upward draught is created. The same arrangements have been adopted for the great dining-hall.

All places which produce any odor whatever, as water-closets, stables, kitchens, etc., are to be ventilated by aspiration. The water-closets will be vigorously ventilated by aspiration; the air being put in motion during the day by mechanical means, while at night gas-jets will cause sufficient movement to assure a good circulation.

The stables, however, present conditions altogether peculiar. The gases which are produced by the decomposition of manure are heavier than the atmosphere, and ventilation must be effected by aspiration through openings near the floor; and, as has been shown by numerous examples, these openings can without causing ill effects be placed near the floor under the mangers. Such openings must be able to remove 200 cubic mètres hourly. In ordinary weather, fresh air can be introduced at the opposite end of the stable near its top, while when the temperature of the outer atmosphere is so low that it would be dangerous to introduce it directly into the stable, a special apparatus is brought into use, which mixes a portion of the air of the stable itself with the outer air before this is allowed to enter. During the daytime, the movement of air is kept up by mechanical means, while at night the burning of gas supplies all the motion that is needed.

For the various bureaus and offices more simple means have been adopted, for in none of them are enough people gathered together to require the employment of any energetic means of ventilation; since the galleries, passages, and staircases are furnished with a more than sufficient supply of fresh air by the opening and shutting of doors. The steam-coils are provided with valves, by which the supply of heat can be regulated at will.

Service des Emprunts et Tirages.[2]—This suite comprises a large hall on the ground floor, which is connected with the various offices, a hall in the sub-basement, and the *Salle St. Jean.*

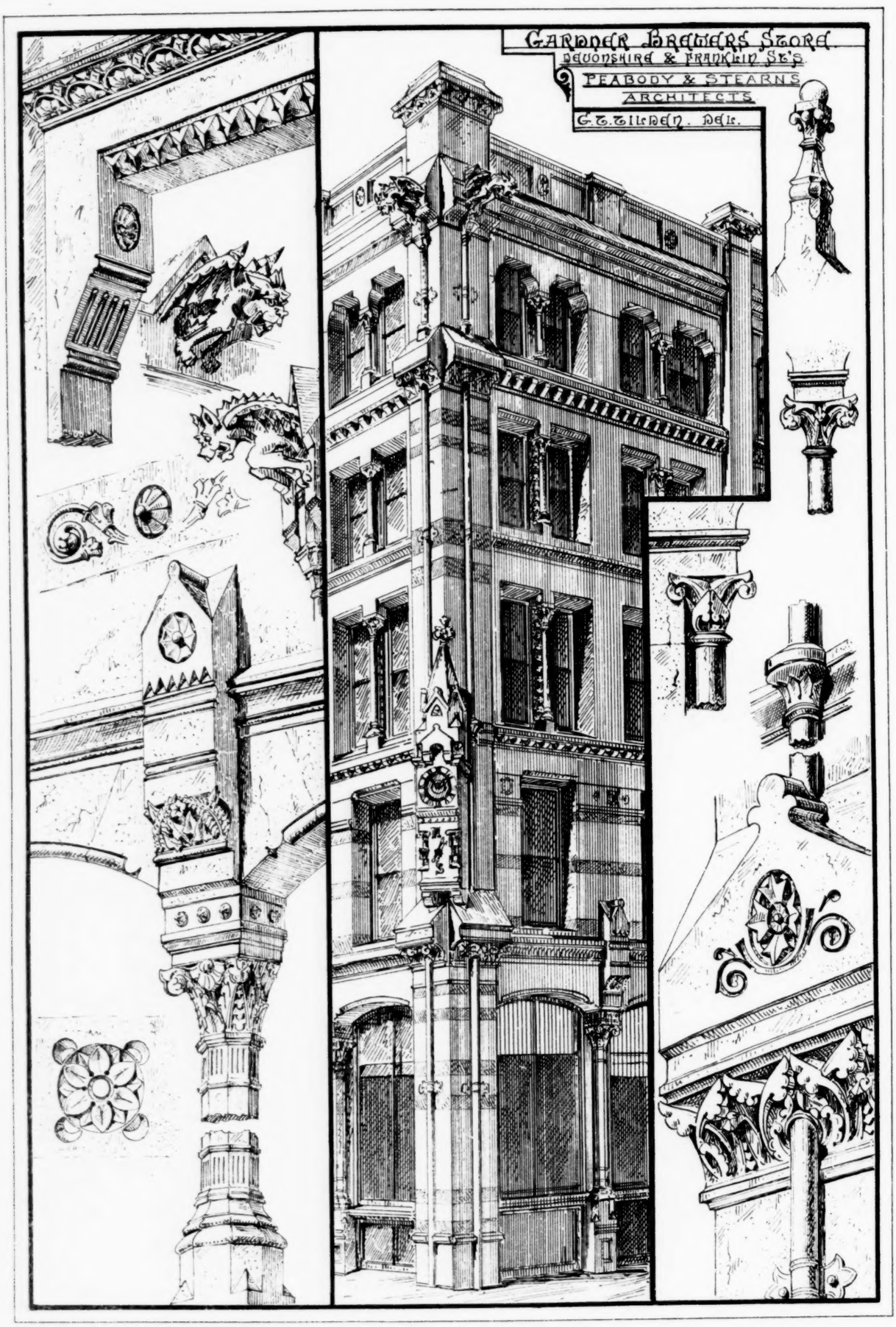
In the great hall, eight large steam coils and openings near the floor for the introduction of hot air afford ample means for heating and ventilating. The offices communicating with this hall are heated by the forced introduction of hot air, so that they will always be under a pressure slightly in excess of that in the large hall. The vitiated air will be withdrawn through openings near the floor and through openings in the glazed ceiling, these last being intended particularly for use during the summer. The hall in the sub-basement will be heated at the top of the room, and also by twenty steam coils arranged at the bases of the columns supporting the floor above. The vitiated air will be withdrawn through openings in the exterior, which empty into a common duct (*caniveau*).

The *Salle St. Jean* will be heated and ventilated by fresh air which passes over heated coils in the great hall in the sub-basement, and is introduced through openings at regular intervals on each side of the hall. Evacuation will take place at the two extremities by the staircases which descend to the sub-basement, and which answer the purpose of great evacuating channels.

[1] See the left-hand part of the section, the façade of the building.

[1] The rooms upon the right of the section, which face upon the river.

[2] Facing on the Rue de Rivoli.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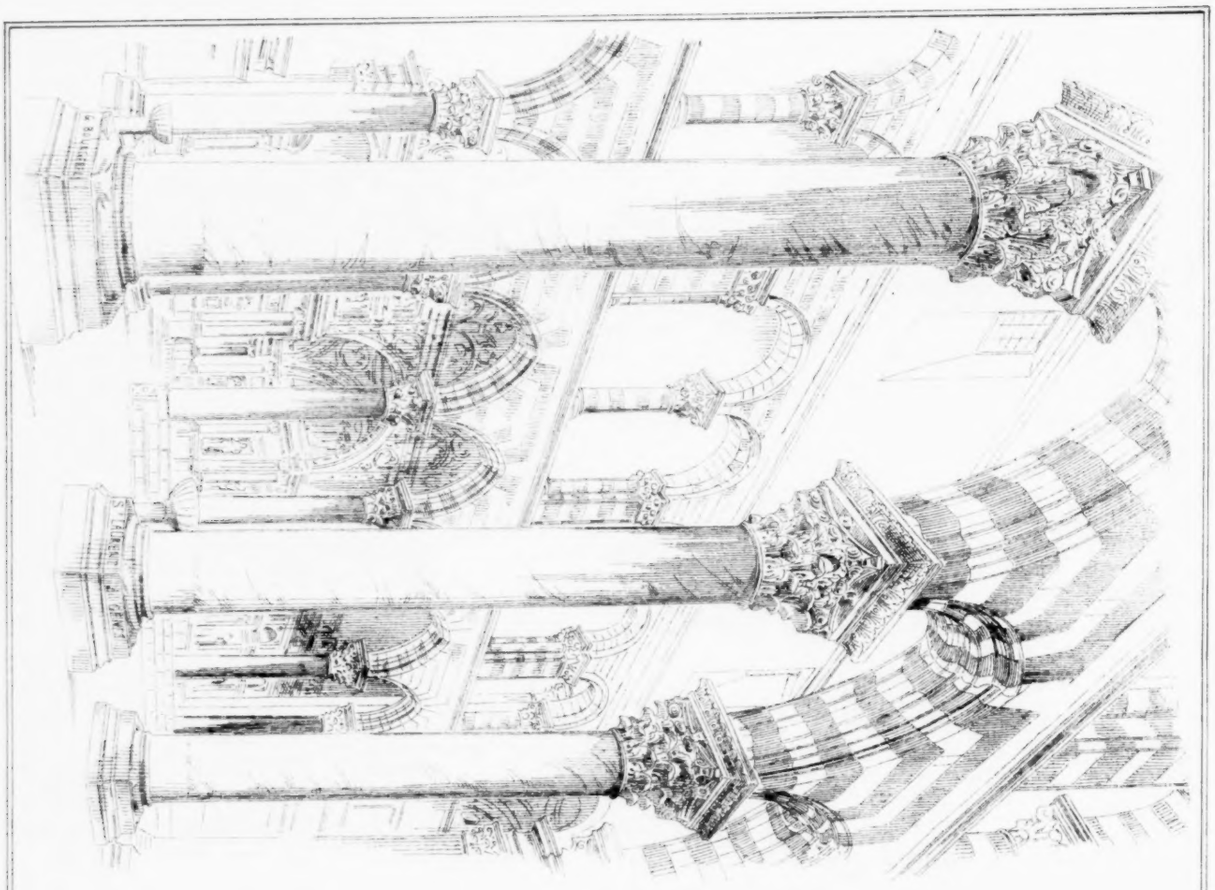
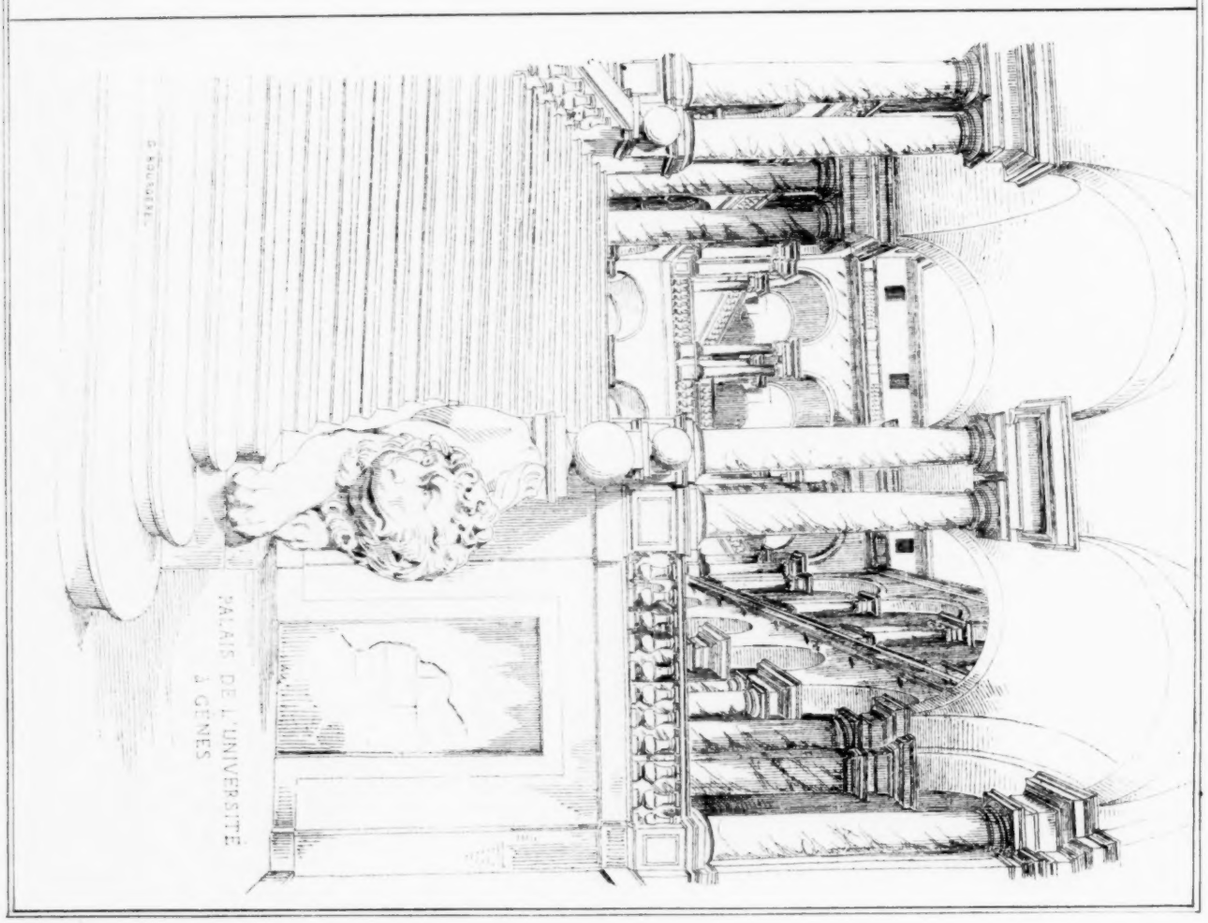
DEVONSHIRE & FRANKLIN STS.
PEABODY & STEARNS
ARCHITECTS
G.T. TILDEN. DEL.




PALAIS DE L'UNIVERSITE
A GENES

HEATING AND VENTILATION OF THE HOTEL DE VILLE, PARIS.
M.M. BAILLE and DE PERTHES, Architects.
CROSS SECTION.

PROPOSED CATHOLIC NEW CHURCH, COLUMBUS, OHIO. — J. T. KIRBY & ALBERT CUMMINS, ARCHITECTS, 121 SOUTH HIGH ST. COLUMBUS, OHIO.

Service des Fêtes. — The heating and ventilating of these rooms, which include all the grand saloons of the first story, are arranged in exactly the same manner as in the suite of the Prefect.

It results from the arrangements that we have just described that it is possible to heat and ventilate a large building, whose needs are so numerous and so various as those of the Hôtel de Ville, by a single group of boilers, and that the management of them is not over-complicated; also that all the practical difficulties attending the heating and putting in motion of so large a body of air are solved by the arrangements indicated above. It should be added, too, that from the point of view of economy, this scheme presents the best conditions, in that as each heating apparatus is controlled by a separate valve, it is reasonable to count upon a total economy of considerable importance in the use of heat.

In conclusion, as it will be interesting to see what will be the expenditure of combustibles for each of these five groups when each is furnished with its maximum supply, the following figures showing how many pounds of soft coal are consumed per hour are appended.

For the Municipal Council,	167
" Prefect,	572
" Offices,	744
" Loans Office,	398
" State Apartments,	858
	2,739

or in all, less than a ton and a half per hour. These figures show better than would a long discussion, the advantages which this scheme presents. — *La Semaine des Constructeurs.*

CURIOSITIES OF TRADES-UNIONISM.

THE difficulties in the labor market have had, amongst other effects, that of bringing forward a number of grumblers at the manner in which the British workman now pursues his calling. Thus a correspondent of the *Liverpool Courier* narrates the following cases which have come within his "own knowledge." "A gentleman in Warwickshire, six miles from a town, required some alterations and repairs to his house. The first day the workmen came out he found them on his lawn, under a tree, smoking, and on inquiring why they did not set to work, was told the 'club' allowed an hour for every three miles from town; the railway brought them in twenty minutes; they therefore had an hour and forty minutes to spare, and would be fined if they started work before the time. Recently I required four or five new bricks in the back of my kitchen grate. Two men came to do the job. I asked what the second man was for, and was told the 'club' required that each brick-setter should be attended by a laborer, 'but this chap can't do nought at this job, but I should be fined if I come without him.' When the town hall in one of the pottery towns was being built, the architect procured certain ornamental bricks from Kent. The club declined to allow the workmen to use them, because they came from a distance beyond the radius prescribed by its rules. The men were ordered to strike, and the building was finished by men imported from France; and for some time military protection had to be given to the strangers. When Watts & Co. of Manchester were roofing their new warehouses, the contractor used horse-power to hoist the slates. When a third of the work was done, the club ordered the slating to be undone, the slates taken down and carried up ladders by men. The contractor refused; the men were ordered to strike; and the contractor and his partner finished the job with their own hands, and became liable to heavy forfeit for non-performance of contract to time. Recently two new shops were erected in Manchester fronted with Bath stone. Every stone arrived ready for fixing, but the club declined to allow the stone to be used unless the dumb show of 'tooling' was gone through on the ground, and the men paid the same as though they had actually tooled it. This was refused; the men were ordered to strike, and the work was finished by Belgians. I could fill a book with similar instances of union tyranny. Workmen have repeatedly told me that they won't bring their sons up to their trade, as no union man has any chance of rising above one miserable dead level; and that as regards pay, the scamp and 'duffer' is as well off as the skilled man and the sober man, and that inevitably the quality of British work must deteriorate. Indeed, that it has deteriorated during the last thirty years is evident to any one old enough to remember the work done thirty years ago, or intelligent enough to observe the difference between modern work and the work of our fathers' time."

Another gentleman, writing to the *Manchester Examiner and Times*, says, "A short time ago a friend of mine had a bit of joiner's work that required doing, for which eighteen pence would have been an ample payment. One day a joiner came to the job, but speedily adjourned to an adjacent beer-house, and his visits to that place of refreshment were repeated at short intervals during the day. My friend thought this style of thing looked more like play than work, but he was undeceived when he received a bill of 7*s.* 6*d.* for ten hours' 'work,' at 9*d.* per hour. This case clearly shows who will have to pay the additional sum per hour should the joiners succeed in the strike in which they are now engaged; and it will not be denied that in most trades increased wages mean greater intemperance, with less work, and that of an inferior quality." — *British Architect.*

PORTLAND CEMENT.

WE quote the concluding passages from Mr. Deacon's paper on cement, which we mentioned in a late issue: —

"*Portland Cement Setting.* — One of the qualities of both natural and artificial cements, as distinguished from limes, is their property of quick-setting. This peculiarity is valuable in some plasterer's work, and in pointing joints in running water, where the mortar would otherwise be washed out; but there are probably few other circumstances in which any advantage is derived from the use of very quick-setting cement. On the contrary, it is exceedingly difficult to insure its immediate application after gauging, and any remixing greatly weakens, if it does not altogether destroy, the cohesion.

"The best Portland cement has most fortunately the property of setting much more slowly than any other, and it may therefore be used with far greater safety in situations where its application cannot be closely watched.

"In certain classes of work it is extremely difficult to place mortar or concrete *in situ* immediately it is mixed. Take, for example, the case of a carriage-way foundation 25 feet wide. The excavated materials must be removed from, and the concrete materials brought to, the face of the work by the same route; and if the concrete is to be immediately laid, the mixing apparatus, and the men employed in the work, must be accommodated on the narrow excavated ground, and must be moved back as the work proceeds.

"The great advantage which would arise if the concrete or mortar could be brought to the ground ready mixed must be apparent to all. To ascertain if this was possible without deteriorating the quality of the work, the author, in 1872, prepared twenty-four blocks of concrete of one cubic foot each, and allowed different periods to elapse between gauging the material and moulding it. These blocks were tested by crushing at the material-testing machine in Birkenhead, belonging to the Mersey Docks and Harbor Board, with the following results: —

RESULTS OF TESTS AS TO THE RESISTANCE TO CRUSHING OF PORTLAND CEMENT CONCRETE BLOCKS, EACH BLOCK 1 FT. CUBE. PROPORTION OF GRAVEL TO CEMENT, 5 TO 1.

Intervals in minutes between gauging concrete and filling moulds.

	0	20	30	40	45	50	60	75	90
Resistance to crushing in tons after 28 days..	48.1	50.0	50.0	50.0		47.15	42.15		
Resistance to crushing in tons after 26 days..	43.0	48.0	50.0	47.17		47.0	48.15		
Average.....	45.55	49.0	50.0	48.58		47.07	45.15		
24 days.....	49.15		50.0		50.0		49.12	43.1	37.1
21 days.....	50.0		50.0		50.0		46.0	5.00	50.0
Average.....	49.57		50.0		50.0		47.56	46.55	43.55

"It is unfortunate that the power of the machine was limited to fifty tons, and that out of twenty-four blocks, eleven were therefore not broken. But the result proved beyond doubt that on the average these blocks, the concrete of which had stood from twenty to thirty minutes before being placed in the moulds, were actually stronger than those in which the concrete was immediately moulded.

"The author is only able to explain this on the assumption that even in this good and well-purged cement there was some free lime which began to slack on the application of water, thus producing numerous but invisible points of weakness in the blocks first moulded; while in those made with concrete, allowed to stand after gauging, the materials were not moulded until the slacking process was completed.

"Since the date of those tests about 100,000 yards of concrete have been laid, after being mixed in and carted from the nearest available yard. The rate of progress of the work had been greatly increased, and the results have been in all respects satisfactory.

"It is necessary to remark here that although this is a valuable quality of good Portland cement, it would be most dangerous to take advantage of it without making quite certain that the cement is good and not quick-setting.

"*Use of Portland Cement in Iron-work.* — Until Portland cement of good quality was applied for the purpose of making joints between iron and stone-work, there was no entirely satisfactory material for the purpose. The author has used it under a great variety of conditions; and when other conditions failed to keep the tar of a roadway from passing between buckled plates and the arched ribs of a wrought-iron bridge, calking with Portland cement was perfectly successful. In preserving the bottoms of iron ships it has been long used with the greatest advantage, and in conjunction with iron girder work it is more easily and safely employed than any other material.

"*Conclusion.* — In this paper the author's object has been to bring before the society certain facts concerning Portland cement, which have presented themselves in the course of his experience. Those who desire to obtain a complete knowledge of the subject as previously published cannot do better than read the two papers by Mr. Grant.

"In conclusion, the author expresses a hope that the simple mode of testing by transverse strength will be adopted by those engineers and architects who require the use of Portland cement only occasionally and in small quantities. Those who do adopt it will find a material at command absolutely certain in its action, by which far the strongest, and, strength for strength, the cheapest, concrete can be made, and which, when used for jointing brickwork or masonry, will in a few weeks give a strength greater than has been attained, even after indurating for 2,000 years, by the imperishable mortars of ancient Rome."

THE WASHINGTON MONUMENT.

28th July, 1877.

Editor of American Architect and Building News.

Sir, — In your issue of 21st inst., treating of designs for completing the Washington Monument, you have fallen into some errors.

The design submitted by Gen. Meigs was not by him compared to the tower of Vienna, the spire of St. Stephen's — but to that of Venice, which is not in style or details incongruous with the Washington Monument, so far as yet built.

The public press seems to have fallen foul of both Mr. Mead and Gen. Meigs, for daring, now that the monument has been brought to a stop, to suggest ideas for its possible and practicable completion. The press objects to one as a sculptor, and to the other as an engineer, for venturing to speak on the subject of a monument, and seems to hold that none but architects and editors and press correspondents may without presumption treat the question involved in its completion. And why? If a sculptor, the author of the greatest purely monumental structure in our country, — that of Lincoln, — may not speak of a monument, pray who may?

The work, as it does not and will not stand, is the design of an architect. It has stood still for years, because no one among the crowds who have subscribed their dollars has approved that architect's design. You do not approve it. No one except the original architect, and the committee which has had the work in charge, ever approved or liked the design. Finally when Congress, appealed to in the centennial year of the country to make an appropriation of public money for its completion, responded to the appeal, but imposed the condition that competent engineers should examine the foundations and report that the money would not be thrown away upon a structure which would not stand, they reported that its foundations were already loaded beyond the limits of safety. This was announced to the public; and no architect came forward to suggest any method by which the precious design of the original architect could be completed or modified, and made possible and stable. In this difficulty, a sculptor whose works give him the right to have an opinion on the subject of monuments, and an engineer who has been more or less engaged in building, and who has studied architecture somewhat and inspected many monuments at home and abroad, offered their mites, their suggestions towards the solution of the question; whereupon the editors and the correspondents fall foul of both.

What right, say they, has a sculptor to suggest a modification of the wonderful design of Mills, the deceased architect, and to suggest that a colossal statue like those of Nero, of Commodus, of Carlo Borromeo in Italy, like the Apollos of the Capitol and of Rhodes, like the Bavaria of Munich, and the Hermann of Germany, would be a fit termination for the tower of Washington? Yet the world looks at such of these colossi as are still standing with interest, sometimes with admiration; and it gapes over the foot of Nero and the arm of Commodus in the museum of the Roman Capitol.

And what right had an engineer to suggest that the square, solid marble tower might be finished in the spirit of some of the many beautiful towers of Northern Italy, and to indicate as perhaps the most suitable that of the Venetian Piazza, about which American travellers ravé, and of which they bring back engravings and photographs; which Turner painted, and on which every artist tries his brush?

Verily, it was presumptuous; but it may, after all, do good. It may excite some competent architect to take up architect Mills's unfinished work, which won't stand, to reduce its useless load as suggested by the presumptuous engineer, and make a design either for a lighter factory-chimney or for something better, — tower, campanile, spire, or what not. Nothing can be balder, uglier, or more unmeaning than the original Mills design, which seems to call for half a dozen mills at its base, to give it some inkling of meaning and of purpose, and which, as designed by the architect, won't stand on the architect's foundations.

Begging pardon for having presumed to offer a suggestion on this subject, — sacred monopoly of architects, and tabooed to all the rest of mankind except editors and correspondents, — I remain your obedient servant,

M. C. Meigs.

[The description of the project of Gen. Meigs for the completion of the Washington Monument, which we printed in our issue of July 21 (p. 229), was, we are sorry to say, subject to the errors common to correspondence from the capital. We now learn from one who writes with apparently better authority, that Gen. Meigs's proposition is to erect upon the unfinished marble obelisk 174 feet high, an open loggia of the same material 50 feet high, crowned with a light spire of copper, the whole being somewhat in the manner of the Campanile of San Marco at Venice, but exceeding it in height by 120 feet. The scheme also involves the removal of 12,000,000 pounds of rough backing in the present structure in order to lessen its weight; and as the new superstructure would not weigh more than 4,000,000 pounds, it is considered that the whole mass would not unduly load the present overtaxed foundations. We owe it to Gen. Meigs to make this correction; but it remains none the less true that a monument of this importance should not be erected, — or as in the present case, completed, — without the aid of the very best artistic ability, architectural, and other, which the country affords. The only way in which the Monument Association can properly meet this very great responsibility is, as we have already suggested, to ask for a national competition of designs, the programme for such competition to be prepared with the assistance of the Trustees of the American Institute of Architects, who should also advise regarding the relative merits of the designs submitted.

This paragraph was already in type when we received the above communication from Gen. Meigs, whose proposition, as now correctly understood, is of a character to deserve consideration, and perhaps sets forth one of the means by which our national reputation, now imperilled by this terrible stump, may be preserved and strengthened. Our attention was originally attracted by the paragraph which so traduced Gen. Meigs's scheme; and, if he will allow us to say so, it seemed to justify our natural distrust for amateur designs. Our call was addressed to architects, because the problem presented seemed peculiarly architectural. Our object, however, will be really attained, if the Monument Association will take pains to obtain and execute the best available design, whether from the hands of an engineer, a sculptor, an architect, or of all three combined. — Ed. American Architect.]

BLACK MORTAR.

Bridgeport, Conn.

Editor of American Architect.

Dear Sir, — Can you by letter, or through the columns of your paper, inform me what are the best ingredients for making black mortar? Lampblack is, I believe, commonly used, but I have found that, when used alone, it is inclined to "wash out," and has not sufficient "grit" to make it desirable. It has been suggested that the use of fine coal-dust or foundry-sand mixed with the lampblack would make a mortar that will hold its color, and stand the weather. Will those that have had experience in using black mortar please enlighten me?

Very truly, B.

SAND FOUNDATIONS.

In a communication lately made to the *Société des Ingénieurs Civils*, M. Lavezzari gave an account of the different devices to which he had been driven during the building of the hospital at Berck-sur-Mer. In this communication there are three points worthy of note. The first is the usage of sand for foundations on untrustworthy soil; the second is the precautions which were taken against the penetration of the walls by moisture, a result much to be feared because of the situation in which the hospital was built; the third is the manner of making a great paving of Portland cement.

The hospital at Berck, built upon sandy downs of a very diversified surface, covers a surface of more than ten thousand square mètres (about two and one-half acres), and hardly one-tenth of it is built over cellars. In order to lay the foundation, it was necessary to proceed as follows: a general levelling of the site took place; the surface was filled in where it was necessary, and cut away at other points. Trenches were then cut, into which was to be poured beton to the thickness of seventy centimètres (twenty-seven inches). The walls were to be seventeen mètres (fifty-five feet) high; and the question to be decided was, whether they could hope to have good foundation on the sandy soil, a great part of which had been filled in, and what precautions must be taken to effect this. The solution adopted by the architect was effectual; for during the ten years that have passed since the building was finished, not the slightest settlement has taken place.

The sand in its undisturbed beds offered sufficient resistance; for, as we have often pointed out, sand is perfectly incompressible; and it is well known that this property of sand is of every-day use in striking the centrings of vaults and arches. In this direction then, there was no trouble to be apprehended. The difficulty was to obtain a good footing upon the made land. Experiments were made: boxes one mètre high were filled with loose sand, which was carefully rammed, causing the level of the surface to sink seven or eight centimètres (three inches); but when water was poured in, a new settling of five centimètres (two inches) took place; after which the sand in the box had manifestly the same compactness as the sand in its natural beds. Consequently the five hectares (twelve acres) of land were levelled, the trenches for the foundation walls were dug, and were then filled with water until the sand would absorb no more; then the beton was put in. This beton was made with sand taken from the downs themselves, where it had freshened by long exposure to the weather, mixed with hydraulic cement and flint-stones found in the chalk deposits near by, and also with pounded shards from the neighboring potteries; and this simple and economical solution has proved itself entirely satisfactory.

M. Lavezzari also cites an instance where sand was used for a similar purpose. While building a viaduct at Rouen, a soil was encountered so untrustworthy that it would have been necessary to use piles at a heavy cost had it not been possible to employ sand as indicated above. In this case sand to the depth of a mètre was spread upon the bottom of the excavation, where it was forthwith abundantly saturated with the water which the excavations themselves contained. When the sand was perfectly saturated, the beton was poured in; and upon this the viaduct was built, which has never shown any sign of failure. It should however be said that at Rouen the area of the surface of the masonry foundation was more than double that usually allowed for such piers.

It is of course necessary to make sure that no spring or subterranean water-course can wash away the sand thus used for foundations; but the slow infiltration of water is far from harmful, as it allows the sand to pack down more solidly.

Another instance of the value of sand for foundations was also cited in the case of a lofty chimney built over the galleries of a deserted sandstone quarry. A pit was dug at the chosen site down to the floor of the lowest of the deserted galleries, and then filled with sand to a depth of eight mètres (thirty-one feet). Upon this the chimney was built. This case suggests the question whether it would not have been possible to employ a process of this nature for the foundations of the palace upon the Trocadéro, rather than to have squandered the millions which have been buried in filling in the abandoned quarry galleries that underlie the pavilions of the new palace.

The construction of the hospital at Berck presented a second problem for solution. The bricks used, to the number of 16,000,000 — for very little stone has been used on this building — are very porous and constantly impregnated with moisture, for besides the rain which is violently dashed against the walls by the gales of a stormy coast, they are saturated with salts which retain moisture. It was very necessary to guard against defects which would be so prejudicial to a hospital.

The walls were built double; the outer one only half a brick thick, and separated from the inner one by an air space of five centimètres (two inches), and connected to it by occasional headers, the area of whose sections is equal to about one-tenth of the area of the surface of the wall In spite of this outer shell, and in spite of the air space, the moisture penetrated to the inner face of the interior wall by means of the headers. Therefore the architect had recourse to two other devices which have given satisfactory results. The inner wall was stripped of its plastering, and the joints of the brickwork were raked out; then it was covered with common roofing slates which were laid from the top down, so that the lap was made upwards instead of downwards as upon roofs. Upon this surface the plastering was laid, the laps of the slates furnishing sufficient key. This gives very satisfactory results so long as the slates are unbroken by having nails driven through them. The second method was to apply to the inner surface of the brickwork two coats of coal-tar, and then to plaster upon this. It is indispensable that the first coat should be applied in a very liquid state, which is effected by adding to it essence of turpentine or benzine. The second coat may be applied as thick as is desired. There is no danger that the coal-tar will discolor the plastering when this has a lime base.

Finally in the matter of flagging, which was all made of Portland cement, some useful information was imparted. The flagging at Berck was laid without using any foundation of beton below it, but was simply laid upon a bed of wetted sand. The general character of this flagging is excellent, though in some parts shrinkage has taken place and some cracks widely separated are apparent. While on the subject it is worth while to once more recommend that when Portland cement is used it should be well sprinkled one or two hours after setting and also during the first few days after it is laid. It is worthy of mention that cracks produced by the shrinkage of Portland cement decrease in size and number as the proportion of sand to cement is increased: when the mixture has one part of cement to three parts of sand, the cracks entirely disappear. This was the proportion used at Berck, but unfortunately there was a lack of good gravel, and it was therefore necessary to increase the proportion of sand. These cracks can also be prevented by adding one tenth part of fat lime. The justice of these different assertions which are confirmed by experience can be easily verified when one considers the operations that take place in the cement at the moment of setting. When the mixture is made with coarse-grained sand, the cement which is lodged in the interstices of the sand is divided into little masses which are in a manner independent and isolated from one another by the sand, and it is upon these isolated and independent masses that the shrinkage operates. On the other hand, when fine-grained sand is used, the whole mass becomes homogeneous, which when shrinkage takes place is often rent into slabs by the long and deep fissures that are produced by it. — *La Semaine des Constructeurs.*

NOTES AND CLIPPINGS.

THE BALTIMORE CITY HALL. — One of the old landmarks of Baltimore, the City Hall, on Holliday Street, is soon to be torn down. It was built by Rembrandt Peale in 1813 as a museum, and was a popular place of resort for nearly seventeen years, when it was purchased by the Common Council. It was the first building in the city that was lighted with gas — Mr. Peale charging a small fee in 1816 for the exhibition of carburetted hydrogen gas.

THE CLEVELAND VIADUCT. — With the exception of an iron swing bridge of 332 feet span, which gives two openings of 150 feet each, the viaduct at Cleveland, O., will be built of masonry. It will connect two portions of the city which are now separated by a ravine. It is composed of ten nearly circular arches, eight of which have spans of 83 feet, and are 33½ feet in height, while the other two have spans of 97½ feet, and have the same rise. The pier for the swing bridge is 40 feet in diameter at the bottom, diminishing to 33 feet at the top: it rests upon 309 piles 45 feet long. The road-bed is at a height of between 50 and 60 feet.

PRACTICAL DESIGN AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. — The trustees of the Lowell Institute have made an arrangement with the Massachusetts Institute of Technology for a free course of instruction in "practical design for manufactures," open to pupils of both sexes. Designing is to be studied as an art which can be applied to decoration, or for patterns for fabrics. During the next year the managers of this institute will have looms of all kinds running. Among them will be a pattern loom. The instruction in this department will accordingly be so extended as to make the designer familiar with the weaving of the fabric according to the pattern, and will include the intricate and elaborate operation of putting the patterns in the form for weaving, which, to the uninitiated observer, looks like a tangled wilderness of twine. It is also proposed to unite with the study of chemistry the art of making colors.

ARTESIAN WELL. — An artesian well, which has reached to a depth of 1,377 feet, is being bored at Charleston, S.C. 1,370 feet of piping have been inserted, and as fast as the depth is increased more piping will be used, until a stratum is reached sufficiently hard to render this unnecessary. One small head of water has been reached, but it was so small that it has been shut off.

CLAY RAILROAD TIES. — An Iowa man has invented and patented a railroad tie made of potter's clay. It is in sections of about a foot long, which are bolted together. The pieces are about eight inches thick, and are burned as hard as a flint.

AN OLD MARBLEHEAD CHURCH. — St. Michael's Church at Marblehead, Mass., which is said to be the oldest edifice of the Episcopal Church in New England, was erected in 1705, the frame and all the material used in its construction being brought from England. The building retains many of its original features: the ancient reredos, with its credo and decalogue; the ancient chandelier, "the gift of John Elbridge, Esq., of ye city of Bristol, 1732," which, on special occasions, is used to illuminate the church; the original lock and key with which the doors were fastened by the church fathers; and the same old pulpit, of a wine-glass pattern. It is a boast of the old parish that its second rector, Rev. David Mosson, performed the marriage ceremony for George Washington and Mrs. Custis.

TOWN HEATING BY STEAM. — Mr. Holly's method of heating towns by steam is shortly to have a practical trial at Lockport, N.Y., as the pipes are nearly all laid, and every thing is ready for the trial.

BURSTING OF A DAM. — Early on the morning of July 30, Strathaven Dam on Big Crum Creek at Swarthmore, Penn., gave way, causing great damage to property below. Ten houses in Avondale were washed out, and several persons carried down the stream, but were all saved. Great damage was done to farmhouses along the creek. Three bridges, a wool-house, wagons, fences, trees, and almost every thing near the banks of the creek were swept away.

CREAM-COLORED BRICKS. — Mr. T. M. Clark of Ottawa, Canada, has found that common red brick clay, when mixed with a certain portion of fresh water shell-marl, produces a beautiful white or cream-colored brick. Bricks made in this way have been used to a considerable extent in Ottawa city. This discovery is of importance, as shell-marl exists in a great many places in Ontario and Quebec, and white bricks may now be made at these localities instead of the less valuable red ones.

GOOD WORKMANSHIP. — It is said that the Masonic Temple at New Haven, which has been built but five years, has been declared unsafe, the walls being far from perpendicular.

THE ROOSEVELT MONUMENT. — The Roosevelt Hospital, New York, consists of a number of buildings included in the block bounded by Ninth and Tenth Avenues, and Fifty-eighth and Fifty-ninth Streets. The buildings, grounds, and a large amount of money were gifts from James Henry Roosevelt. The managers of the institution have determined to raise a monument to Mr. Roosevelt. It will be pyramidal in shape, and will be composed of two large pieces of granite, each over six feet in height. A raised shield and flowers ornament the upper portion. Under them is a piece of scroll-work on which are cut the words, "*Qui Plantavit Curabit.*" A portion of the upper stone is polished, and has the following inscription in raised letters: "James Henry Roosevelt, the generous founder of this Hospital, born in the city of New York, Nov. 10, 1800, died Nov. 30, 1863. A man upright in his aims, simple in his habits, sublime in his benefaction." The pedestal is finished, but the inscription is not yet cut.

GOLD FROM THE ROOF OF THE MINT. — The Philadelphia *Bulletin* says: "The dust which has been allowed to accumulate upon the roof of the Philadelphia Mint during the past twenty-five years was collected recently, by order of Gov. Pollock, for the purpose of ascertaining what proportion of metal it contained. The roof is of asphalt, and, as it softens, the dust sticks to it tenaciously. Some amount of difficulty was consequently experienced in removing it, but finally a quantity amounting to 1,732 pounds in weight was removed. This has just been submitted to the usual assaying process, and the result shows that 42 ounces of standard gold and 96½ ounces of standard silver — a total valuation of about $850 — had been conveyed in the upward flight of the smoke of the chimney to the place where it became located for a season. A similar experiment was tried a quarter of a century ago, and out of 3.80 ounces of dust an ounce of gold was extracted, which is now exhibited as a curiosity in the office of the assayer. The floors of the Mint are swept every week and the accumulation preserved, and once a year the woodwork of the refining-room and the gloves of the employees are burned and the precious dust obtained from them, while the residue is sold to sweep-smelters.

ICE MACHINE. — An ice machine at Dallas, Tex., just built, can make a cake of ice 30 feet long and six feet wide, and weighing 10,000 or 12,000 pounds. It is formed by freezing fine spray as it falls upon a board. Four cakes of ice can be made each day. The works cost $30,000.

A SIGN OF THE TIMES. — Only twelve of the fifty-five lime-kilns at Rockland, Me., are in operation, owing to lack of business.

CLEOPATRA'S NEEDLE. — The obelisk, and the vessel for its conveyance to London, will be launched about the 10th of August, if the weather is favorable.

STREET DUST. — Signor Parnetti has, during the last four years, analyzed the dust and *débris* of the streets of Florence and Paris. His investigation of the *débris* of the horse-paths proves that the dust contains 35 per cent of iron given off by the shoes of the horses. In the dust from the sidewalks he finds from 30 to 40 per cent of good glue. Signor Parnetti selected and treated separately the dust from the causeways of the Boulevard des Italiens during a period of two months, which uniformly gave 30 per cent of good transparent glue, it is said quite equal to Belfast glue. He proposes to place his discoveries at the service of a limited company, with a view of establishing blast furnaces on the banks of the Thames, to recover the iron thus lost, and a large glue works, which, it is thought, will produce more glue from the wasted material than will supply all London for every purpose.

EXHIBITION OF PREMIATED ARTICLES. — It is suggested by Sir Julius Vogel in the *London Times*, that at the close of the forthcoming Paris International Exhibition there should be a supplementary exhibition of all the articles which are praised by the jury. He thinks it would be a great incentive to exhibitors of a really good class, as to occupy a place in the prize exhibition would mean the certainty of their goods being examined and appreciated by many thousands of intelligent people.

VENUS OF MILO. — The truth of the finding of the arms of the Venus of Milo is denied on all hands.

A PREHISTORIC CITY. — A late number of the *Academy* gives a description of the ruins of a prehistoric city in Tuscany that has recently been discovered. It lies in the district of the *Maremma*, out of the line of travel, on the upper part of Monte Leone. The walls, which are of boulders about three feet in length, fitted together with rude rubble, and about twenty feet in thickness, cover a circuit of fifteen miles. They are about seven feet high, but were evidently much higher originally. They are broken at intervals, but no gates are to be seen. They were no doubt built for defensive purposes, and were either the acropolis of a city or the fortified enclosure of one. It must have been as large as imperial Rome itself. Owing to the density of the forest, the remains are difficult of exploration. If they are not Etruscan, they must belong to a very remote antiquity.

LA SEMAINE DES CONSTRUCTEURS. — *La Semaine des Constructeurs* signalizes the beginning of its second year by an increase of the number of its pages.

VIADUCT. — The Göltzschthal Viaduct in Saxony is four stories high.

A DUTCH COMPETITION. — The Dutch government is about to open a competition for a new University Building at Leyden. The appropriation for the building is about $450,000. The successful competitor is to carry out his design or receive in lieu of this a premium of 5,000 florins ($2,200). Designs must be sent in on or before Oct. 1, 1877.

ROMAN BRIDGES. — The stone bridge over the Adda at Prezzo was the longest stone bridge that the Romans are known to have built: it had a span of 246 feet. The next longest was the one over the river Dee, which had a span of 200 feet.

TRAJAN'S BRIDGE AND WALL. — Trajan's Bridge over the river Danube was not a mere floating bridge, but a permanent structure, carried on piers 150 feet high and 60 feet wide, and it comprised 20 arches, extending altogether over a span of 4,770 Roman feet. This giant structure seems to have been intended as a fortress as well as a bridge. Standing as it did 80 feet above the water, a garrison posted on it would be able to damage or destroy vessels passing under it, while they would be above the reach of retaliation. It was destroyed by Hadrian, and its precise locality has been the subject of some dispute. Ruins which evidently might have formed the buttresses of a bridge, occurring on the line of an old Roman road, however, seem to leave little room for doubt. Trajan's wall is another relic of this terribly energetic old Roman. It is, strictly speaking, a rampart of earth about 35 or 40 miles long, and extends from Rassova, just at the bend in the Danube, to the shores of the Black Sea. Though only an earthwork, it is a formidable line of defence. It is eight or ten feet high, with a fosse in front of it, while the western portion is still further fortified by deep lakes and the swampy valley of Kara-Su. In addition to all this, another rampart of a similar character lies just in the rear of it. This is known as the south wall, the space between the two ramparts being from 1,000 to 2,000 feet.

THE TOMB OF KING DAVID. — The tomb of David, just south of the walls of Jerusalem, has been explored. It is now a Mohammedan mosque.

COLORING ZINC ROOFS. — Among recent German inventions is a simple process, depending on the use of acetate of lead, by which every kind of color is applicable to sheets of zinc. By mixing black lead, for instance, with the salt, a very agreeable light brown hue is obtained. It is by this process that the cupola of the synagogue at Nuremberg has been painted. A sufficient length of time has already elapsed, it is said, to show that the atmosphere has had no influence on the zinc sheeting of the roof, thus showing the practical value of the process in such cases. By the addition of other coloring matters, light or dark shades of yellow or gray may be produced.

MODERN RESTORATION. — At a late meeting of the Royal Institute of British Architects, Sir Gilbert Scott in replying to a paper on Architectural Restorations read by Mr. Stevenson at the previous meeting gave several instances of the absurdities that would result, should Mr. Stevenson's conservative doctrine be followed out. Among other examples Sir Gilbert referred to Llandaff Cathedral, which had been allowed from the Reformation downwards to fall into a semi-ruinous state. In the middle of the last century they set to work to redeem it. Their system was as follows: They sent for Mr. Wood of Bath, who had just erected the Pump-Room there. He seemed to have advised that so much of the eastern part as they thought needful should be cut out from the rest and internally converted so far as might be into a double of his Pump-Room. He found the arcades, projecting strings, labels, etc., a bore: so he walled up the arches, chopped off projecting mouldings, and as the old walls might prove to be damp, he battened them over, cutting the grounds to which his battens were nailed deep into the walls. By this clever device, he was able to shut out from view all that was Gothic; and an enthusiastic clergyman writes at the time, "The church in the inside as far as it is ceiled and plastered looks exceedingly fine, and when finished it will in the judgment of most people who have seen it be a very neat and elegant church." The rest he happily left a ruin of which the architecture was as fine as any thing in the country.

THE STATUS OF WORKING-MEN IN ENGLAND. — An architect and business man of Birmingham, England, writes: "What with trades-unions, strikes, etc., we have great difficulty in this country. Of course many, very many, of our working-men are sober, decent members of society, with comfortable homes and money in the bank; but I am ashamed to say that so many of the class are very improvident, low in moral tone, and their sole object seems to be to get through their work and receive their wages at the end of the week, without taking any interest in the work they are doing. Then, they do not turn out so much work as they used to do, taking into account shorter working hours. Some years ago, a bricklayer would lay 1,000 bricks in a day, and lay them well too; now I doubt if any lay 500. Again, the trades-unions, as at present constituted, are, to my mind, a very bad thing. They lay down the law so strictly that the men are slaves to themselves and their unions. We need to sing 'Britons never shall be slaves,' but I fear that many of us are slaves now under a self-instituted bondage. Why should not a man do extra work, and so get more money, if he can and is able? This he cannot do in many cases now, as the unionists say it would cause less men to be employed. Now many good workmen are unable to get higher wages than others who just manage to keep up to a certain standard, and that generally not a high one. You see I take rather a low view of the present state of our working-men, and I am afraid that an immense amount of education will be needed to mend matters."

TALL STUDENTS. — A Wisconsin paper recently stated that a certain Board of Education had resolved "to erect a building large enough to accommodate 500 students three stories high."